This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a minor, municipal permit. The discharge results from the operation of a 0.1 MGD wastewater treatment plant. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq.

1.	Facility Name and Mailing Address:	Shenandoah Crossing STP 10 Shenandoah Crossing Drive Gordonsville, VA 22942	SIC Code:	4952 WWTP
	Facility Location:	Route 749, 3.6 miles SE of Route 15/33 intersection	County:	Louisa
	Facility Contact Name:	Tim Bernhardt	Telephone Number:	540-832-9508
2.	Permit No.:	VA0076678	Current Expiration Date:	19 January 2008
	Other VPDES Permits:	VAN030119		
	Other Permits:	N/A		
	E2/E3/E4 Status:	N/A		
3.	Owner Name:	Leisure Capital Corporation		
	Owner Contact/Title:	Don Jackson / VP Development	Telephone Number:	516-912-8147
4.	Application Complete Date:	18 September 2007		
	Permit Drafted By:	Douglas Frasier	Date Drafted:	9 November 2007 17 March 2008
	Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	16 November 2007 19 March 2008
	Public Comment Period:	Start Date: 2 May 2008	End Date:	3 June 2008
5.	Receiving Waters Information:	See **Attachment 1** for the Flow Frequency Determination		
	Receiving Stream Name:	Lickinghole Creek		
	Drainage Area at Outfall:	2.73 square miles	River Mile:	0.54
	Stream Basin:	York River	Subbasin:	None
	Section:	3	Stream Class:	III
	Special Standards:	None	Waterbody ID:	VAN-F01R
	7Q10 Low Flow:	0.0 MGD*	7Q10 High Flow:	0.08 MGD
	1Q10 Low Flow:	0.0 MGD*	1Q10 High Flow:	0.05 MGD
	Harmonic Mean Flow:	0.0 MGD	30Q5 Flow:	0.01 MGD
	303(d) Listed:	No	30Q10 Flow:	0.0 MGD*
	TMDL Approved:	Downstream of facility	Date TMDL Approved:	2 August 2006

*It is staff's best professional judgement that the critical flows, 7Q10 and 30Q10, are 0.0 MGD since the outfall is located below a spillway; thus, there would be no flow during extended drought conditions.

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

✓	State Water Control Law		EPA Guidelines
✓	Clean Water Act	✓	Water Quality Standards
✓	VPDES Permit Regulation		Other
✓	EPA NPDES Regulation		

7. Licensed Operator Requirements: Class III

8. Reliability Class: Class II

9. Permit Characterization:

✓ Private	✓ Effluent Limited	___ Possible Interstate Effect
___ Federal	✓ Water Quality Limited	___ Compliance Schedule Required
___ State	___ Toxics Monitoring Program Required	___ Interim Limits in Permit
___ POTW	___ Pretreatment Program Required	___ Interim Limits in Other Document
✓ TMDL		

10. Wastewater Sources and Treatment Description:

Shenandoah Crossing is a private resort community. Wastewater sources consist of a golf course, clubhouse, condominiums, a lodge, a manor house, time-share cabins, RV area, campground and single family residential homes. Additional residential lots are under or will be under development as the resort has phased expansion plans in place. The plant recently expanded, adding another extended aeration treatment package system that can be operated in parallel with the existing plant. This additional treatment allowed the facility to expand from 0.05 MGD to 0.1 MGD to accommodate the growth within the resort community.

The plant consists of the following treatment units: preliminary (screening), anoxic, extended aeration, clarification, tertiary filtration, disinfection via chlorination, dechlorination and post aeration prior to discharge. Wastewater is pumped to the headworks of the plant from the resort. The flow passes through a comminutor prior to a manual bar screen. After screening, the flow is directed to the anoxic/equalization tank for denitrification. There are two chemical feeds available at this treatment unit: magnesium hydroxide for alkalinity for the nitrification process and alum for precipitation of phosphorus. Flow then enters the aeration basins. The plant consists of two parallel trains. Alum can be added at the end of the aeration tank to further enhance phosphorus precipitation. After the aeration tanks, the flow is directed to the clarifiers. RAS is pumped to the anoxic tank, the WAS is pumped to a holding tank prior to trucking it out. The wastewater then flows to two (2) rapid sand gravity filters consisting of anthracite coal and sand to further remove suspended solids.

Disinfection is accomplished via chlorination using a tablet chlorinator. After the chlorine contact tank, the wastewater is dechlorinated, reaerated and finally discharged to Lickinghole Creek.

See **Attachment 2** for a facility schematic/diagram.

TABLE 1
Outfall Description

Outfall Number	Discharge Sources	Treatment	Design Flow	Outfall Latitude and Longitude
001	Domestic Wastewater	See Item 10 above.	0.1 MGD	**38° 04' 32" N** **78° 08' 57" W**

See **Attachment 3** for topographic map.

11. Sludge Treatment and Disposal Methods:

Sludge is wasted to a concrete holding tank (20,000 gallon capacity) located on the west side of the anoxic tank. Sludge hauler is contacted as needed to pump and haul sludge to the Louisa Wastewater Treatment Plant (VA0067954) for further treatment and final disposal.

12. Discharges, Intakes, Monitoring Stations and Other Items in Vicinity of Discharge

TABLE 2
In-Stream Monitoring Stations, Discharges and Intakes

River Mile	Description and Type
0.23 (South Anna River, UT)	Gordonsville STP (VA0021105) – 0.667 MGD Municipal Discharge
100.53 (South Anna River)	Gordonsville Power Plant (VA0087033) – 0.047 MGD Industrial Discharge
91.64 (South Anna River)	DEQ Monitoring Station (8-SAR091.64) at Rt. 695
3.1 (Central Branch, UT)	Virginia Oil - Zion Crossroads STP (VA0088706) – 0.0395 MGD Municipal Discharge
Impoundment on Camp Creek	Zion Crossroads WWTP (VA0090743) – 0.1 MGD Municipal Discharge
89.35 (South Anna River)	DEQ Monitoring Station (8-SAR089.35) at Rt. 613

13. Material Storage:

TABLE 3 Material Storage	
Materials Description	Spill/Stormwater Prevention Measures
Alum	In building, under roof
Magnesium hydroxide	In building, under roof

14. Site Inspection: Performed by NRO staff on 28 August 2007. See **Attachment 4** for the Inspection Summary. The entire report is included in the permit file.

15. Receiving Stream Water Quality and Water Quality Standards:

a) Ambient Water Quality Data

DEQ has no monitoring data for Lickinghole Creek. The nearest downstream monitoring station is located at the Route 695 crossing of the South Anna River (Station 8-SAR091.64), approximately 4.29 rivermiles downstream of Outfall 001.

There are numerous downstream impairments for bacteria. A TMDL for the Pamunkey River Basin was approved by the EPA on 2 August 2006 for bacteria. While the receiving stream was not included since it is not impaired, all upstream facilities were given wasteload allocations. Shenandoah Crossing STP was given a WLA of 1.7×10^{11} cfu/year for *E. coli*.

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2006 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment.

In response, the Virginia General Assembly amended the State Water Control Law in 2005 to include the *Chesapeake Bay Watershed Nutrient Credit Exchange Program*. This statute set forth total nitrogen and total phosphorus discharge restrictions within the bay watershed. Concurrently, the State Water Control Board adopted new water quality criteria for the Chesapeake Bay and its tidal tributaries. These actions necessitate the evaluation and the inclusion of nitrogen and phosphorus limits on discharges within the bay watershed.

b) Receiving Stream Water Quality Criteria

Part IX of 9 VAC 25-260 (360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream Lickinghole Creek is located within Section 3 of the York River Basin and classified as Class III water.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32°C and maintain a pH of 6.0-9.0 standard units (S.U.).

Attachment 5 details other water quality criteria applicable to the receiving stream.

Ammonia:

Staff re-evaluated the effluent data and found no significant difference from the pH data used to establish ammonia criteria during the 2003 reissuance. Staff used a default temperature value of 25°C since there was no temperature effluent data available. The calculated water quality criteria are shown in **Attachment 5**.

Metals Criteria:

The Water Quality Criteria for some metals are dependent on the receiving stream's hardness (expressed as mg/L calcium carbonate). Since there was no receiving stream hardness data, staff used the most recent 8 months of effluent hardness data to calculate an average value of 102 mg/L. It is staff's best professional judgement to use these data since it reflects the current operation of the plant with the new units on line. The hardness-dependent metals criteria shown in **Attachment 5** are based on this value.

Bacteria Criteria:

The Virginia Water Quality Standards (9 VAC 25-260-170.B.) states sewage discharges shall be disinfected to achieve the following criteria:

E. coli bacteria per 100 mL of water shall not exceed the following:

	Geometric Mean[1]	Single Sample Maximum
Freshwater *E. coli* (N/100 mL)	126	235

[1]For two or more samples taken during any calendar month.

c) Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9 VAC 25-260-360, 370 and 380) designates the river basins, sections, classes and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Lickinghole Creek, is located within Section 3 of the York River Basin. This section has been designated with no special standard.

d) Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched for records to determine if there are threatened or endangered species in the vicinity of the discharge. The following threatened or endangered species were identified within a 2 mile radius of the discharge: Bald Eagle and Loggerhead Shrike (songbird). The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and therefore, protect the threatened and endangered species found near the discharge.

16. Antidegradation (9 VAC 25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream has been classified as Tier 1 based on the fact that the outfall is located downstream of the lake spillway. During extreme drought conditions, overflow from the lake would not occur, essentially creating an intermittent stream. Permit limits proposed have been established by determining wasteload allocations which will result in attaining and/or maintaining all water quality criteria which apply to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are the calculated on the most limiting WLA, the required sampling frequency and statistical characteristics of the effluent data.

a) Effluent Screening

Effluent data obtained from Discharge Monitoring Reports (DMRs) has been reviewed and determined to be suitable for evaluation. Data set is included in the permit file.

b) Mixing Zones and Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o [Q_e + (f) (Q_s)] - [(C_s) (f) (Q_s)]}{Q_e}$$

Where:
- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- f = Decimal fraction of critical flow from mixing evaluation
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; harmonic mean for carcinogen-human health criteria; 3Q10 for ammonia criteria; and 30Q5 for non-carcinogen human health criteria)
- C_s = Mean background concentration of parameter in the receiving stream.

It is staff's best professional judgement that the water segment receiving the discharge via Outfall 001 is considered to have a 7Q10 and 1Q10 of 0.0 MGD during extreme conditions. The facility discharges below the overflow for Izac Lake and as such, there is no mixing zone and the WLA is equal to the C_o during extended periods of drought conditions. However, the flow frequencies during wet weather are assumed as stated in **Attachment 1** when calculating the WLAs.

The Water Quality Standards contain two distinct mixing zone requirements. The first requirement is general in nature and requires the "use of mixing zone concepts in evaluating permit limits for acute and chronic standards in 9 VAC 25-260-140.B". The second requirement is specific and establishes special restrictions for regulatory mixing zones "established by the Board".

The Department of Environmental Quality uses a simplified mixing model to estimate the amount of mixing of a discharge with the receiving stream within specified acute and chronic exposure periods. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 - 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).
- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).
- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.
- Lateral mixing (across the width) is a linear function of distance downstream.
- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).
- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.
- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

If it is suitably demonstrated that a reasonable potential for lethality or chronic impacts within the physical mixing area doesn't exist, then the basic complete mix equation, with 100% of the applicable stream flow, is appropriate. If the mixing analysis determines there is a potential for lethality or chronic impacts within the physical mixing area, then the proportion of stream flow that has mixed with the effluent over the allowed exposure time is used in the basic complete mix equation. As such, the wasteload allocation equation is modified to account for the decimal fraction of critical flow (f).

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent (e.g., total residual chlorine where chlorine is used as a means of disinfection) and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia as N is likely present since this is a WWTP treating sewage and total residual chlorine may be present since chlorine is used for disinfection. As such, **Attachment 5** details the mixing analysis results and WLA derivations for these pollutants.

c) Effluent Limitations Toxic Pollutants, Outfall 001

9 VAC 25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation 9 VAC 25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N/TKN:

Staff reevaluated the effluent pH and has concluded it is not significantly different than what was used previously to derive ammonia criteria. However, upon calculating the Wasteload Allocations and subsequent limits, it was concluded that the facility would be given a limit of 1.3 mg/L compared to the current limit of 3.0 mg/L for ammonia during the months of December – February (**Attachment 6**). The facility has a TKN limit of 3.0 mg/L for the months of March – November.

Further review of effluent data since 2002 revealed that the facility achieved levels below the stated limits, with an exception during startup of the new aeration units. The effluent data is included in the permit file.

Given that (1) the facility has a history of achieving TKN and ammonia levels below permitted limits, (2) the facility is subject to nutrient reporting under the *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* and (3) the receiving stream could consist of 100% effluent during extreme conditions (e.g. drought), it is staff's best professional judgement that the facility be given a year round TKN limit of 3.0 mg/L. A TKN limit of 3.0 mg/L assumes that the remaining nitrogen is in the form of refractory organic compounds that will not be easily oxidized and that ammonia is removed when the 3.0 mg/L TKN limit is met. The weekly average limit will be 4.5 mg/L based on a multiplier of 1.5 times the monthly average.

2) Total Residual Chlorine:

Chlorine is used for disinfection and is potentially in the discharge. Staff calculated WLAs for TRC using current critical flows and the mixing allowance. In accordance with current DEQ guidance, staff used a default data point of 0.2 mg/L and the calculated WLAs to derive limits. A monthly average of 0.008 mg/L and a weekly average limit of 0.010 mg/L are proposed for this discharge (see **Attachment 7**).

3) Metals/Organics:

Limits are needed for copper. The current permit has a limit of 15 µg/L. Upon review of effluent hardness data and subsequent WLA determination, it was concluded that the facility would have a new limit of 14 µg/L (**Attachment 8**).

d) Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to Dissolved Oxygen (D.O.), carbonaceous Biochemical Oxygen Demand-5 day ($cBOD_5$), Total Suspended Solids (TSS) and pH limitations are proposed.

D.O., $cBOD_5$ and TKN limitations are based on best professional judgement and Guidance Memo 00-2011. This guidance is applicable to waters that cannot be easily modeled. A discharge meeting these limits will not normally violate the stream standards even if the stream consists of 100% effluent.

It is staff's practice to equate the TSS limits with the $cBOD_5$ limits since the two pollutants are closely related in terms of treatment of domestic sewage.

pH limitations are set at the water quality criteria.

This permit previously monitored the disinfection of treated wastewater through minimum TRC limits, with samples collected immediately prior to dechlorination. While these effluent limits and monitoring requirements are retained in this permit, the addition of an *E. coli* effluent limitation is intended to further confirm adequate disinfection.

E. coli limitations are in accordance with the Water Quality Standards 9 VAC25-260-170 and the Pamunkey River Basin TMDL. *E. coli* monitoring frequency is proposed at twice per month.

e) Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

VPDES Regulation 9 VAC 25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries.

The State Water Control Board adopted new Water Quality Criteria for the Chesapeake Bay in March 2005. In addition to the Water Quality Standards, there are three new regulations that necessitate nutrient limitations:

- 9 VAC 25-40 – *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* requires discharges with design flows of $\geq$ 0.04 MGD to treat for TN and TP to either BNR levels (TN = 8.0 mg/L; TP = 1.0 mg/L) or SOA levels (TN = 3.0 mg/L and TP = 0.3 mg/L).

- 9 VAC 25-720 – *Water Quality Management Plan Regulation* sets forth TN and TP maximum wasteload allocations for facilities with design flows of $\geq$ 0.5 MGD limiting the mass loading from these discharges.

- 9 VAC 25-820 – *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* was approved by the State Water Control Board on 6 September 2006 and became effective 1 January 2007. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited and otherwise regulated under the general permit and not this individual permit.

Annual average effluent limitations, as well as monthly and year to date calculations, for Total Nitrogen and Total Phosphorus are included in this individual permit. This facility is subject to 9 VAC 25-40-70 since the Certificate To Operate (CTO) as of 1 July 2005 was 0.05 MGD and the facility has expanded to 0.1 MGD after that date.

Concentration limits of 8.0mg/L TN annual average and 1.0 mg/L TP annual average are needed based on 9 VAC 25-40-70.A.(2). Loading limits are governed by the general permit (VAN030119).

f) Effluent Limitations and Monitoring Summary

The effluent limitations are presented in the following table. Limits were established for Flow, $cBOD_5$, Total Suspended Solids (TSS), TKN, pH, Dissolved Oxygen (D.O.) and Total Residual Chlorine (TRC).

The limit for TSS is based on Best Professional Judgement.

The mass loading (kg/d) for $cBOD_5$ and TSS monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 3.785.

The mass loading (lb/d) for TKN monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 8.3438.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual, consideration of the general permit requirements and staff's best professional judgement.

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

19. Effluent Limitations/Monitoring Requirements:

Design flow is 0.1 MGD.
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	N/A	N/A	NL	Continuous	TIRE
pH	3	N/A	N/A	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	3	10 mg/L 3.8 kg/day	15 mg/L 5.7 kg/day	N/A	N/A	2/M	8H-C
Total Suspended Solids (TSS)	2	10 mg/L 3.8 kg/day	15 mg/L 5.7 kg/day	N/A	N/A	2/M	8H-C
DO	3	N/A	N/A	7.0 mg/L	N/A	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	3	3.0 mg/L 2.5 lb/day	4.5 mg/L 3.8 lb/day	N/A	N/A	2/M	8H-C
E. coli (Geometric Mean)	3,5	126 n/100 mL	N/A	N/A	N/A	2/M	Grab
Total Residual Chlorine (after contact tank)	4	N/A	N/A	1.0 mg/L	N/A	3/D at 4 hr Intervals	Grab
Total Residual Chlorine (after dechlorination)	3	0.008 mg/L	0.010 mg/L	N/A	N/A	1/D	Grab
Nitrate+Nitrite, as N	3,6	NL mg/L	N/A	N/A	N/A	2/M	8H-C
Total Nitrogen [a.]	3,6	NL mg/L	N/A	N/A	N/A	1/M	Calculated
Total Nitrogen – Year to Date [b.]	3,6	NL mg/L	N/A	N/A	N/A	1/M	Calculated
Total Nitrogen – Calendar Year [b.]	3,6	8.0 mg/L	N/A	N/A	N/A	1/Y	Calculated
Total Phosphorus	3	NL mg/L	N/A	N/A	N/A	2/M	8H-C
Total Phosphorus – Year to Date [b.]	3,6	NL mg/L	N/A	N/A	N/A	1/M	Calculated
Total Phosphorus – Calendar Year [b.]	3,6	1.0 mg/L	N/A	N/A	N/A	1/Y	Calculated
Copper, Total Recoverable	3	14 µg/L	14 µg/L	N/A	N/A	1/M	Grab

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. Pamunkey River Basin TMDL (**Attachment 9**)
6. 9 VAC 25-40
   9 VAC 25-820

MGD = Million gallons per day.
N/A = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.
3/D = Three times every day.
2/M = Twice every month, > 7 days apart.
1/M = Once every month.
1/Y = Once every 12 months.

8H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the monitored 8-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of eight (8) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum eight (8) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

EST = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

b. See Section 20 for the explanation for the Nutrient Calculations.

20. Other Permit Requirements:

Part I.B. of the permit contains additional chlorine monitoring requirements, quantification levels and compliance reporting instructions.

Minimum chlorine residual must be maintained at the exit of the chlorine contact tank to assure adequate disinfection. No more than nine (9) of the monthly test results for TRC at the exit of the chlorine contact tank shall be < 1.0 mg/L with any TRC < 0.6 mg/L considered a system failure. *E. coli* limits are defined in this section as well as monitoring requirements to take effect should an alternate means of disinfection be used.

9 VAC 25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9 VAC 25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9 VAC 25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia define how annual nutrient loads are to be calculated; this is carried forward in 9 VAC 25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

21. Other Special Conditions:

a) 95% Capacity Reopener. The VPDES Permit Regulation at 9 VAC 25-31-200.B.2. requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. The facility is a PVOTW.

b) Indirect Dischargers. Required by VPDES Permit Regulation, 9 VAC 25-31-280 B.9 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c) O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9 VAC 25-31-190.E. The permittee submitted for approval a revised Operations and Maintenance (O&M) Manual on 14 August 2007 due to the installation of the additional treatment units. Future changes to the facility must be addressed by the submittal of a revised O&M Manual within 90 days of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d) CTC, CTO Requirement. The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.

e) Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9 VAC 25-31-200 D, and Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.) requires licensure of operators. This facility requires a Class III operator.

f) Reliability Class. The Sewage Collection and Treatment Regulation at 9 VAC 25-790 requires sewerage works achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. The facility is required to meet Reliability Class II.

g) Sludge Reopener. The VPDES Permit Regulation at 9 VAC 25-31-200.C.4. requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works.

h) Sludge Use and Disposal. The VPDES Permit Regulation at 9 VAC 25-31-100.P., 220.B.2., and 420-720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements may be derived from the Virginia Department of Health's Biosolids Use Regulations, 12 VAC 5-585-10 et seq. The facility includes a treatment works treating domestic sewage.

j) E3/E4. 9 VAC 25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

k) Nutrient Reopener. 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

22. Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

a) Special Conditions:

1. The E3/E4 condition was added.
2. The Nutrient Reopener condition was included with this reissuance.
3. TMDL Reopener was included with this reissuance.

b) Monitoring and Effluent Limitations:

1. The Ammonia as N limit (Dec – Feb) has been removed.
2. A year round TKN limit has been proposed.
3. Total Hardness monitoring has been removed, completed during the last permit cycle.
4. Copper limitation was reduced due to new effluent hardness data.
5. TN and TP annual average effluent limitations were included.
6. *E. coli* monitoring at twice per month was included with this reissuance.
7. Flow tiers for 0.05 MGD and 0.075 MGD were removed.

24. Variances/Alternate Limits or Conditions: None

25. Public Notice Information:

First Public Notice Date: 1 May 2008 Second Public Notice Date: 8 May 2008

Public Notice Information is required by 9 VAC 25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: Northern DEQ Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3873, ddfrasier@deq.virginia.gov. See **Attachment 10** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

26. 303 (d) Listed Stream Segments and Total Max. Daily Loads (TMDL):

There are numerous downstream impairments for bacteria. A TMDL for the Pamunkey River Basin was approved by the EPA on 2 August 2006 for bacteria. While the receiving stream was not included since it is not impaired, all upstream facilities were given wasteload allocations. The Shenandoah Crossing STP was given a WLA of 1.7×10^{11} cfu/year for *E. coli*. The proposed bacteria limitations presented within are in compliance with the TMDL and should not contribute to the downstream impairment.

TMDL Reopener: This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL that may be developed and approved for the receiving stream.

27. Additional Comments:

Previous Board Action(s): The facility experienced effluent violations for TSS, $cBOD_5$, Ammonia as N, TKN and Copper from December 2006 to April 2007, resulting in enforcement action. The terms of the Consent Order are being negotiated between DEQ and Bluegreen Corporation at the time of this final version of the Fact Sheet. It is anticipated that the final Consent Order will be presented to the State Water Control Board in late 2008.

Staff Comments: None received.

Public Comment: No comments were received during the public notice.

EPA Checklist: The checklist can be found in **Attachment 11**.

Fact Sheet Attachments – Table of Contents

Shenandoah Crossing STP
VA0076678
2008 Reissuance

Attachment 1

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
Water Quality Assessments and Planning
629 E. Main Street P.O. Box 10009 Richmond, Virginia 23240

SUBJECT: Flow Frequency Determination
Shenandoah Crossing STP - #VA0076678

TO: Anna Westernik, NRO

FROM: Paul E. Herman, P.E., WQAP

DATE: July 15, 2002

COPIES: File

This memo supersedes my August 15, 1997, memo to J.R. Pandey concerning the subject VPDES permit.

The Shenandoah Crossing STP discharges to the Lickinghole Creek near Boswells Tavern, VA. Stream flow frequencies are required at this site by the permit writer for the purpose of calculating effluent limitations for the VPDES permit.

The VDEQ conducted several flow measurements on the Lickinghole Creek from 1997 to 2001. The measurements were made below Izac Lake, just above the discharge point. The measurements were correlated with the same day daily mean values from the continuous record gage on the Robinson River near Locust Dale, VA #01666500. The measurements and daily mean values were plotted on a logarithmic graph and a best-fit line was drawn through the data points. Any zero flow measurements were considered to be 0.0001 cfs in order to be incorporated into the logarithmic plot. The required flow frequencies from the reference gage were plugged into the equation for the regression line and the associated flow frequencies at the measurement site/discharge point were calculated. The data for the reference gage and the measurement site/discharge point are presented below:

Robinson River near Locust Dale, VA (#01666500):

Drainage Area = 179 mi^2

1Q10 = 7.59 cfs — High Flow 1Q10 = 44.3 cfs
7Q10 = 10.8 cfs — High Flow 7Q10 = 53.1 cfs
30Q5 = 22.8 cfs — HM = 83.3 cfs

Annual Average = 228 cfs

Lickinghole Creek below Izac Lake, near Boswells Tavern, VA (#01671270):

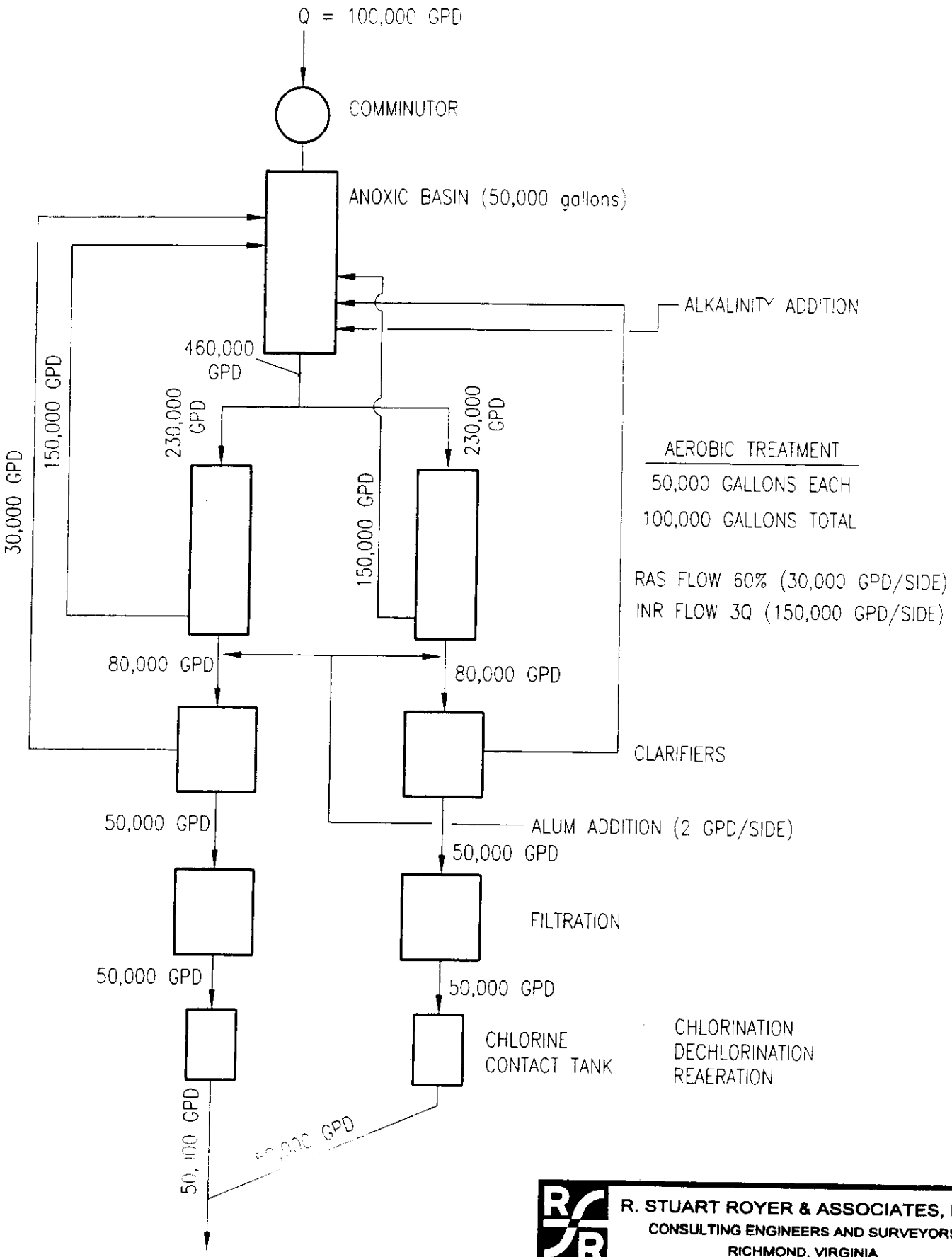
Drainage Area = 2.73 mi^2

1Q10 = 0.001 cfs (0.0006 mgd) — High Flow 1Q10 = 0.076 cfs (0.049 mgd)
7Q10 = 0.002 cfs (0.0013 mgd) — High Flow 7Q10 = 0.123 cfs (0.079 mgd)
30Q5 = 0.013 cfs (0.0084 mgd) — HM = 0.0 cfs*

Annual Average = 6.09 cfs (3.94 mgd)

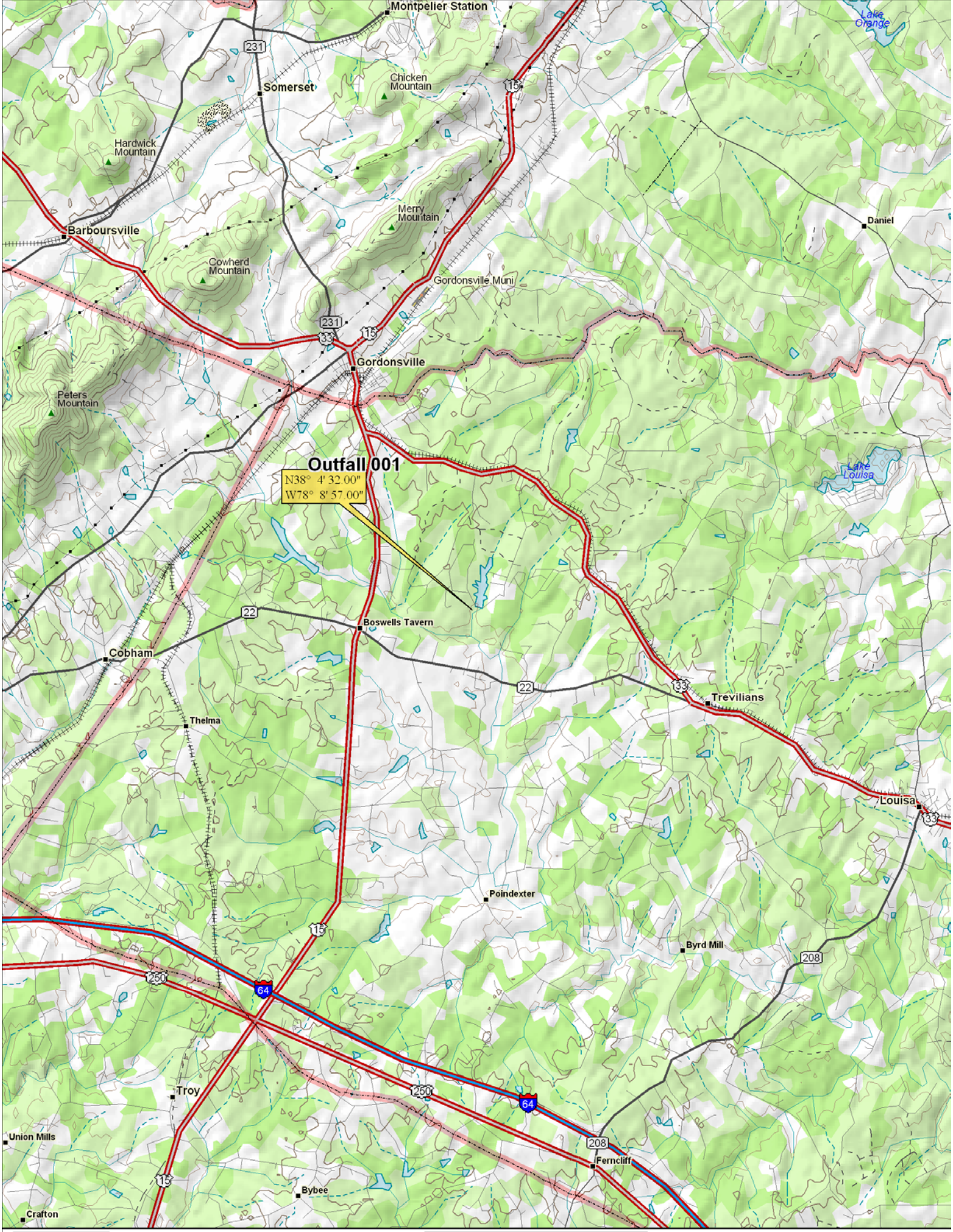
*Due to zero flow measurement.

The high flow months are December through May. If there are any questions concerning this analysis, please let me know.



R. STUART ROYER & ASSOCIATES, INC.
CONSULTING ENGINEERS AND SURVEYORS
RICHMOND, VIRGINIA

SHENANDOAH CROSSING
BLUEGREEN CORP.



Summary of conditions from last inspection (August 23, 2000)

Problem identified		Corrected	Not Corrected
1.	Submit an updated O&M Manual	[X]	[ ]
	Received October 2003		
2.	Perform the maintenance that is due on the STP unit cathode protection system	[X]	[ ]
	Completed September 15, 2000		
3.	Paint unit surfaces where needed to prevent corrosion	[X]	[ ]
4.	Keep hosing stored away from walkways to reduce trip hazards	[X]	[ ]

Summary of conditions for current inspection

Comments:

- **The single family homes each have a grinder pump the waste water passes through prior to reaching STP.**
- **The resort restaurant has a small grease trap connected to the sink to reduce the amount grease and fat entering the STP. This trap is emptied when kitchen personnel realize it's necessary.**
- **The effluent discharge site from the plant is a low sitting open box surrounding the ultrasonic meter, a weir, and the plant end of the discharge pipe. During the inspection, it was observed that the Bobcat operator who was backfilling soil around a new dechlorination tank was inadvertently knocking soil into the box and it was carried out the pipe with the plant effluent. The introduction of sediment at this point in the treatment process would likely lead to a violation of the facility's Total Suspended Solids (TSS) permit limit. While at the facility on Sept 6, 2006, to collect samples for analysis by DCLS, I observed undissolved dechlorination tablet powder in the effluent. This also is likely to cause permit violations for TSS.**

Recommendations for Action:

- **There are a number of trees and shrubs growing up against and between the process tanks (photos 19 & 20). Vegetation must be kept clear of process units because:**
  1. **The roots may grow into small cracks or fissures in the pipes or tanks, causing them to become large cracks and develop leaks.**
  2. **Vegetation may hide indicators of structural problems, such as the leaking weld around the pipe leading from the comminutor to the EQ Basin.**
- **Current devices for removing grease from the raw wastewater prior to it entering the plant appear to be inadequate. There is significant indication of grease in the aeration basin, both as foam and attached to the interior sides of the basin (photos 9 & 10).**
- **Because there appears to be significant grease in the aeration basin, DEQ recommends a program of monitoring oil & grease in the plant's influent to determine incoming loading and determine the effectiveness and current maintenance schedual of the existing grease trap at the restaurant.**
- **There is no record of service for the cross control device (backflow preventor) at the sewage treatment plant. Virginia Department of Health required all cross control devices be serviced and certified annually. The devices should be labeled with the date of service and certification records kept on-site.**

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Shenandoah Crossing STP Permit No.: VA0076678

Receiving Stream: Lickinghole Creek Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =		mg/L	1Q10 (Annual) =	0	MGD	Annual - 1Q10 Mix =	100	%	Mean Hardness (as CaCO3) =	110	mg/L
90% Temperature (Annual) =		deg C	7Q10 (Annual) =	0	MGD	- 7Q10 Mix =	100	%	90% Temp (Annual) =	25	deg C
90% Temperature (Wet season) =		deg C	30Q10 (Annual) =	0	MGD	- 30Q10 Mix =		%	90% Temp (Wet season) =		deg C
90% Maximum pH =		SU	1Q10 (Wet season) =	0.05	MGD	Wet Season - 1Q10 Mix =	100	%	90% Maximum pH =	8.8	SU
10% Maximum pH =		SU	30Q10 (Wet season) =		MGD	- 30Q10 Mix =		%	10% Maximum pH =		SU
Tier Designation (1 or 2) =	1		30Q5 =	0.008	MGD				Discharge Flow =	0.1	MGD
Public Water Supply (PWS) Y/N? =	n		Harmonic Mean =	0	MGD						
Trout Present Y/N? =	n		Annual Average =	n/a	MGD						
Early Life Stages Present Y/N? =	y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	na	2.7E+03	--	--	na	2.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E+03**
Acrolein	0	--	--	na	7.8E+02	--	--	na	8.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.4E+02**
Acrylonitrile[C]	0	--	--	na	6.6E+00	--	--	na	6.6E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.6E+00**
Aldrin [C]	0	3.0E+00	--	na	1.4E-03	3.0E+00	--	na	1.4E-03	--	--	--	--	--	--	--	--	**3.0E+00**	**--**	**na**	**1.4E-03**
Ammonia-N (mg/l) (Yearly)	0	1.84E+00	3.36E-01	na	--	1.8E+00	3.4E-01	na	--	--	--	--	--	--	--	--	--	**1.8E+00**	**3.4E-01**	**na**	**--**
Ammonia-N (mg/l) (High Flow)	0	5.84E+01	6.61E-01	na	--	8.8E+01	6.6E-01	na	--	--	--	--	--	--	--	--	--	**8.8E+01**	**6.6E-01**	**na**	**--**
Anthracene	0	--	--	na	1.1E+05	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+05**
Antimony	0	--	--	na	4.3E+03	--	--	na	4.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.6E+03**
Arsenic	o	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	**3.4E+02**	**1.5E+02**	**na**	**--**
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Benzene [C]	0	--	--	na	7.1E+02	--	--	na	7.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.1E+02**
Benzidine[C]	0	--	--	na	5.4E-03	--	--	na	5.4E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.4E-03**
Benzo (a) anthracene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E-01**
Benzo (b) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E-01**
Benzo (k) fluoranthene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E-01**
Benzo (a) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E-01**
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	1.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+01**
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	1.8E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+05**
Bromoform [C]	0	--	--	na	3.6E+03	--	--	na	3.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.6E+03**
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	5.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.6E+03**
Cadmium	0	4.4E+00	1.2E+00	na	--	4.4E+00	1.2E+00	na	--	--	--	--	--	--	--	--	--	**4.4E+00**	**1.2E+00**	**na**	**--**
Carbon Tetrachloride [C]	0	--	--	na	4.4E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.4E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	na	2.2E-02	2.4E+00	4.3E-03	na	2.2E-02	--	--	--	--	--	--	--	--	**2.4E+00**	**4.3E-03**	**na**	**2.2E-02**
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	**8.6E+05**	**2.3E+05**	**na**	**--**
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	**1.9E+01**	**1.1E+01**	**na**	**--**
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+04**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	3.4E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+02**
Chloroform [C]	0	--	--	na	2.9E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E+04**
2-Chloronaphthalene	0	--	--	na	4.3E+03	--	--	na	4.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.6E+03**
2-Chlorophenol	0	--	--	na	4.0E+02	--	--	na	4.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.3E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	**8.3E-02**	**4.1E-02**	**na**	**--**
Chromium III	0	6.2E+02	8.0E+01	na	--	6.2E+02	8.0E+01	na	--	--	--	--	--	--	--	--	--	**6.2E+02**	**8.0E+01**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	**1.6E+01**	**1.1E+01**	**na**	**--**
Chromium, Total	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E-01**
Copper	0	1.5E+01	9.7E+00	na	--	1.5E+01	9.7E+00	na	--	--	--	--	--	--	--	--	--	**1.5E+01**	**9.7E+00**	**na**	**--**
Cyanide	0	2.2E+01	5.2E+00	na	2.2E+05	2.2E+01	5.2E+00	na	2.3E+05	--	--	--	--	--	--	--	--	**2.2E+01**	**5.2E+00**	**na**	**2.3E+05**
DDD [C]	0	--	--	na	8.4E-03	--	--	na	8.4E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.4E-03**
DDE [C]	0	--	--	na	5.9E-03	--	--	na	5.9E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E-03**
DDT [C]	0	1.1E+00	1.0E-03	na	5.9E-03	1.1E+00	1.0E-03	na	5.9E-03	--	--	--	--	--	--	--	--	**1.1E+00**	**1.0E-03**	**na**	**5.9E-03**
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	**--**	**1.0E-01**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E-01**
Dibutyl phthalate	0	--	--	na	1.2E+04	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+04**
Dichloromethane (Methylene Chloride) [C]	0	--	--	na	1.6E+04	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+04**
1,2-Dichlorobenzene	0	--	--	na	1.7E+04	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+04**
1,3-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.8E+03**
1,4-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.8E+03**
3,3-Dichlorobenzidine[C]	0	--	--	na	7.7E-01	--	--	na	7.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.7E-01**
Dichlorobromomethane [C]	0	--	--	na	4.6E+02	--	--	na	4.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.6E+02**
1,2-Dichloroethane [C]	0	--	--	na	9.9E+02	--	--	na	9.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.9E+02**
1,1-Dichloroethylene	0	--	--	na	1.7E+04	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+04**
1,2-trans-dichloroethylene	0	--	--	na	1.4E+05	--	--	na	1.5E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+05**
2,4-Dichlorophenol	0	--	--	na	7.9E+02	--	--	na	8.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.5E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane[C]	0	--	--	na	3.9E+02	--	--	na	3.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.9E+02**
1,3-Dichloropropene	0	--	--	na	1.7E+03	--	--	na	1.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+03**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	1.4E-03	2.4E-01	5.6E-02	na	1.4E-03	--	--	--	--	--	--	--	--	**2.4E-01**	**5.6E-02**	**na**	**1.4E-03**
Diethyl Phthalate	0	--	--	na	1.2E+05	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+05**
Di-2-Ethylhexyl Phthalate [C]	0	--	--	na	5.9E+01	--	--	na	5.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E+01**
2,4-Dimethylphenol	0	--	--	na	2.3E+03	--	--	na	2.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.5E+03**
Dimethyl Phthalate	0	--	--	na	2.9E+06	--	--	na	3.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.1E+06**
Di-n-Butyl Phthalate	0	--	--	na	1.2E+04	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+04**
2,4 Dinitrophenol	0	--	--	na	1.4E+04	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+04**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	7.65E+02	--	--	na	8.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.3E+02**
2,4-Dinitrotoluene [C]	0	--	--	na	9.1E+01	--	--	na	9.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.1E+01**
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	na	1.2E-06	--	--	na	na	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**na**
1,2-Diphenylhydrazine[C]	0	--	--	na	5.4E+00	--	--	na	5.4E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.4E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.6E+02	--	--	--	--	--	--	--	--	**2.2E-01**	**5.6E-02**	**na**	**2.6E+02**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.6E+02	--	--	--	--	--	--	--	--	**2.2E-01**	**5.6E-02**	**na**	**2.6E+02**
Endosulfan Sulfate	0	--	--	na	2.4E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+02**
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	8.6E-02	3.6E-02	na	8.7E-01	--	--	--	--	--	--	--	--	**8.6E-02**	**3.6E-02**	**na**	**8.7E-01**
Endrin Aldehyde	0	--	--	na	8.1E-01	--	--	na	8.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.7E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.9E+04	--	--	na	3.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.1E+04**
Fluoranthene	0	--	--	na	3.7E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+02**
Fluorene	0	--	--	na	1.4E+04	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.0E-02**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	2.1E-03	5.2E-01	3.8E-03	na	2.1E-03	--	--	--	--	--	--	--	--	**5.2E-01**	**3.8E-03**	**na**	**2.1E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	1.1E-03	5.2E-01	3.8E-03	na	1.1E-03	--	--	--	--	--	--	--	--	**5.2E-01**	**3.8E-03**	**na**	**1.1E-03**
Hexachlorobenzene[C]	0	--	--	na	7.7E-03	--	--	na	7.7E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.7E-03**
Hexachlorobutadiene[C]	0	--	--	na	5.0E+02	--	--	na	5.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.0E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	1.3E-01	--	--	na	1.3E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	4.6E-01	--	--	na	4.6E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.6E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	6.3E-01	9.5E-01	--	na	6.3E-01	--	--	--	--	--	--	--	--	**9.5E-01**	**--**	**na**	**6.3E-01**
Hexachlorocyclopentadiene	0	--	--	na	1.7E+04	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+04**
Hexachloroethane[C]	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.9E+01**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**2.0E+00**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	4.9E-01	--	--	na	4.9E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E-01**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	2.6E+04	--	--	na	2.6E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.6E+04**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Lead	0	1.3E+02	1.5E+01	na	--	1.3E+02	1.5E+01	na	--	--	--	--	--	--	--	--	--	**1.3E+02**	**1.5E+01**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	**--**	**1.0E-01**	**na**	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Mercury	0	1.4E+00	7.7E-01	na	5.1E-02	1.4E+00	7.7E-01	na	5.5E-02	--	--	--	--	--	--	--	--	**1.4E+00**	**7.7E-01**	**na**	**5.5E-02**
Methyl Bromide	0	--	--	na	4.0E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.3E+03**
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	**--**	**3.0E-02**	**na**	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Monochlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.3E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.3E+04**
Nickel	0	2.0E+02	2.2E+01	na	4.6E+03	2.0E+02	2.2E+01	na	5.0E+03	--	--	--	--	--	--	--	--	**2.0E+02**	**2.2E+01**	**na**	**5.0E+03**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	1.9E+03	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+03**
N-Nitrosodimethylamine[C]	0	--	--	na	8.1E+01	--	--	na	8.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.1E+01**
N-Nitrosodiphenylamine[C]	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	1.4E+01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+01**
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	**6.5E-02**	**1.3E-02**	**na**	**--**
PCB-1016	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**na**	**--**
PCB-1221	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**na**	**--**
PCB-1232	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**na**	**--**
PCB-1242	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**na**	**--**
PCB-1248	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**na**	**--**
PCB-1254	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**na**	**--**
PCB-1260	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**na**	**--**
PCB Total[C]	0	--	--	na	1.7E-03	--	--	na	1.7E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E-03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Pentachlorophenol [C]	0	7.7E-03	5.9E-03	na	8.2E+01	7.7E-03	5.9E-03	na	8.2E+01	--	--	--	--	--	--	--	--	**7.7E-03**	**5.9E-03**	**na**	**8.2E+01**
Phenol	0	--	--	na	4.6E+06	--	--	na	5.0E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.0E+06**
Pyrene	0	--	--	na	1.1E+04	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.2E+04**
Radionuclides (pCi/l except Beta/Photon)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Gross Alpha Activity	0	--	--	na	1.5E+01	--	--	na	1.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+01**
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	4.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.3E+00**
Strontium-90	0	--	--	na	8.0E+00	--	--	na	8.6E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.6E+00**
Tritium	0	--	--	na	2.0E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+04**
Selenium	0	2.0E+01	5.0E+00	na	1.1E+04	2.0E+01	5.0E+00	na	1.2E+04	--	--	--	--	--	--	--	--	**2.0E+01**	**5.0E+00**	**na**	**1.2E+04**
Silver	0	4.1E+00	--	na	--	4.1E+00	--	na	--	--	--	--	--	--	--	--	--	**4.1E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	1.1E+02	--	--	na	1.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+02**
Tetrachloroethylene[C]	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.9E+01**
Thallium	0	--	--	na	6.3E+00	--	--	na	6.8E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.8E+00**
Toluene	0	--	--	na	2.0E+05	--	--	na	2.2E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+05**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	7.5E-03	7.3E-01	2.0E-04	na	7.5E-03	--	--	--	--	--	--	--	--	**7.3E-01**	**2.0E-04**	**na**	**7.5E-03**
Tributyltin	0	4.6E-01	6.3E-02	na	--	4.6E-01	6.3E-02	na	--	--	--	--	--	--	--	--	--	**4.6E-01**	**6.3E-02**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	9.4E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+03**
1,1,2-Trichloroethane[C]	0	--	--	na	4.2E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.2E+02**
Trichloroethylene [C]	0	--	--	na	8.1E+02	--	--	na	8.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.1E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	6.5E+01	--	--	na	6.5E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.5E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	6.1E+01	--	--	na	6.1E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.1E+01**
Zinc	0	1.3E+02	1.3E+02	na	6.9E+04	1.3E+02	1.3E+02	na	7.5E+04	--	--	--	--	--	--	--	--	**1.3E+02**	**1.3E+02**	**na**	**7.5E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	4.6E+03
Arsenic	9.0E+01
Barium	na
Cadmium	7.3E-01
Chromium III	4.8E+01
Chromium VI	6.4E+00
Copper	5.8E+00
Iron	na
Lead	9.2E+00
Manganese	na
Mercury	5.5E-02
Nickel	1.3E+01
Selenium	3.0E+00
Silver	1.6E+00
Zinc	5.1E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Mixing Zone Predictions for Shenandoah Crossing STP

Effluent Flow = 0.1 MGD
Stream 7Q10 = 0.08 MGD
Stream 1Q10 = 0.08 MGD
Stream slope = 0.008 ft/ft
Stream width = 2.3 ft
Bottom scale = 2
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .2226 ft
Length = 21.6 ft
Velocity = .5439ft/sec
Residence Time = .0005days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .2226 ft
Length = 21.6 ft
Velocity = .5439ft/sec
Residence Time = .011 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

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Facility = Shenandoah Crossing
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 88
WLAc = 0.66
Q.L. = 0.2
# samples/mo. = 2
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.33166226165477
Average Weekly limit = 1.33166226165477
Average Monthly LImit = 1.08288642916401

The data are:

9

Facility = Shenandoah Crossing
Chemical = Chlorine
Chronic averaging period = 4
WLAa = 0.019
WLAc = 0.011
Q.L. = .1
# samples/mo. = 28
# samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = 20
Variance = 144
C.V. = 0.6
97th percentile daily values = 48.6683
97th percentile 4 day average = 33.2758
97th percentile 30 day average= 24.1210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.60883226245855E-02
Average Weekly limit = 9.8252545713861E-03
Average Monthly LImit = 8.02152773888032E-03

The data are:

20

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Facility = Shenandoah Crossing
Chemical = Copper
Chronic averaging period = 4
WLAa = 15
WLAc = 9.7
Q.L. = 6
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 8
Expected Value = 12.5
Variance = 56.25
C.V. = 0.6
97th percentile daily values = 30.4177
97th percentile 4 day average = 20.7973
97th percentile 30 day average= 15.0756
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 14.1869754053163
Average Weekly limit = 14.1869754053164
Average Monthly LImit = 14.1869754053164

The data are:

8
7
18
11
17
10
16
13

allocation (WLA) was calculated using the *E. coli* limit of 126 cfu/100mL, and *E. coli* loads based on the facility design flow are presented in Table 3.2.

Phase II Municipal Separate Storm Sewer System (MS4) permits were also reviewed and found facilities with MS4 permits discharge within the South Anna River, Northeast Creek, Totopotomoy Creek (VAP-F13R-02), Black Creek (VAP-F13R-05), and Pamunkey River (VAP-F13E-02) watersheds.

Table 3.2. Active VPDES permitted point sources in the Pamunkey River watershed.

Impairment	Permit Number	Facility Name	Sub-shed	Design Flow (MGD)	FC Load (cfu/yr)	*E. coli* Load (cfu/yr)
SA 01	VA0021105	Gordonsville Sewage Treatment Plant	SAR-2	0.940	2.6E+12	1.6E+12
SA 02	VA0088706	Virginia Oil - Zion Crossroads	SAR-6	0.040	1.1E+11	6.9E+10
SA 02	VA0090743	Zion Crossroads WWTP	SAR-6	0.700	1.9E+12	1.2E+12
SA 02	VA0076678	Shenandoah Crossing	SAR-6	0.100	2.8E+11	1.7E+11
SA 02	VAG116048	Ready Mixed Concrete	SAR-06	0.001	2.7E+09	1.7E+09
SA 02	VAG251002	Klochner Pentaplast -	SAR-06	0.001	2.7E+09	1.7E+09
SA 02	VAG406073	Residence	SAR-06	0.001	2.7E+09	1.7E+09
SA 02	VA0088421	Twin Oaks Community STP	SAR-12	0.010	2.8E+10	1.7E+10
SA 03	VA0067954	Louisa Regional Sewage	SAR-14	0.400	1.1E+12	7.0E+11
SA 03	VA0090409	Gum Spring Sewage	SAR-15	0.016	4.4E+10	2.8E+10
SA 03	VA0090140	Six O Five Village M H P STP	SAR-15	0.040	1.1E+11	7.0E+10
SA 03	VA0067105	Missionary Learning Center	SAR-16	0.025	6.9E+10	4.4E+10
SA 03	VAG404000	Resident	SAR-20	0.0005	1.3E+09	7.9E+08
SA 03	VAG404200	Elks Lodge 45	SAR-20	0.0005	1.4E+09	9.0E+08
SA 03	VAG404205	Resident	SAR-20	0.001	2.7E+09	1.7E+09
SA 03	VAG404210	Resident	SAR-20	0.0005	1.3E+09	7.9E+08
SA 03	VAG404217	Resident	SAR-20	0.0006	1.6E+09	1.0E+09
SA 03	VA0022641	Patrick Henry High School	SAR-21	0.040	1.1E+11	7.0E+10
SA 03	VA0060232	Country Club Hills Lagoon	SAR-21	0.060	1.7E+11	1.0E+11
SA 03	VAG404222	Resident	SAR-21	0.0005	1.3E+09	7.9E+08
SA 03	VAG404066	Lees Mobil Service	SAR-21	0.001	2.7E+09	1.7E+09
SA 04	VA0024899	Ashland WWTP	SAR-27	2.000	5.5E+12	3.5E+12
Moncuin / Webb	VA0088102	King William STP	PAR-6	0.050	1.4E+11	8.7E+10

SA 01= South Anna River (VAN-F01R-01) Impairment; SA 02= South Anna River (VAN-F02R-01) Impairment
SA 03= South Anna River (VAN-F04R-01) Impairment; SA 04= South Anna River (VAN-F04R-02) Impairment

Citizens may comment on the proposed reissuance of a permit that allows the release of treated wastewater into a water body in Louisa County, Virginia

PUBLIC COMMENT PERIOD: May 2, 2008 to 5:00 p.m. on June 3, 2008

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater
Owners or operators of municipal facilities that discharge or propose to discharge wastewater into the streams, rivers or bays of Virginia from a point source must apply for this permit. In general, point sources are fixed sources of pollution such as pipes, ditches or channels. The applicant must submit the application to the Department of Environmental Quality, under the authority of the State Water Control Board.

PURPOSE OF NOTICE: To invite the public to comment on the draft permit.

NAME, ADDRESS AND PERMIT NUMBER OF APPLICANT: Bluegreen Corporation
4960 Conference Way North, Suite 100
Boca Raton, FL 33431
VA0076678

NAME AND ADDRESS OF FACILITY: Shenandoah Crossing STP
10 Shenandoah Crossing Drive, Gordonsville, VA 22942

Project description: Bluegreen Corporation has applied for a reissuance of a permit for Shenandoah Crossing STP in Louisa County, Virginia. The applicant proposes to release treated sewage at a rate of 0.1 Million Gallons per Day into the Lickinghole Creek in Louisa County that is in the York River watershed. A watershed is the land area drained by a river and its incoming streams. The sludge will be disposed of at the Louisa Wastewater Treatment Plant (VA0067954). The permit will limit the following pollutants to amounts that protect water quality: Flow, pH, cBOD, TSS, DO, TKN, *E. coli,* Chlorine, Total Nitrogen, Total Phosphorus and Copper.

This facility is subject to the requirements of 9 VAC 25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

How a decision is made: After public comments have been considered and addressed by the permit or other means, DEQ will make the final decision unless there is a public hearing. DEQ may hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the proposed permit. If there is a public hearing, the State Water Control Board will make the final decision.

HOW TO COMMENT: DEQ accepts comments by e-mail, fax or postal mail. All comments must be in writing and be received by DEQ during the comment period. The public also may request a public hearing.

WRITTEN COMMENTS MUST INCLUDE:
1. The names, mailing addresses and telephone numbers of the person commenting and of all people represented by the citizen.
2. If a public hearing is requested, the reason for holding a hearing, including associated concerns.
3. A brief, informal statement regarding the extent of the interest of the person commenting, including how the operation of the facility or activity affects the citizen.

TO REVIEW THE DRAFT PERMIT AND APPLICATION: The public may review the documents at the DEQ-Northern Regional Office every work day by appointment.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION:
Name: Douglas Frasier
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3873 E-mail: ddfrasier@deq.virginia.gov Fax: (703) 583-3841

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	Shenandoah Crossing STP
NPDES Permit Number:	VA0076678
Permit Writer Name:	Douglas Frasier
Date:	09 November 2007

Major [ ] **Minor** [X] **Industrial** [ ] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?			X
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?			X
8. Whole Effluent Toxicity Test summary and analysis?			X
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	X		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?		X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?		X	
a. Has a TMDL been developed and approved by EPA for the impaired water?			X
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?			X
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		X	
10. Does the permit authorize discharges of storm water?		X	

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?	X		
12. Are there any production-based, technology-based effluent limits in the permit?	X		
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs
(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	**Yes**	**No**	**N/A**
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	**Yes**	**No**	**N/A**
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X

II.C. Technology-Based Effluent Limits (POTWs)	**Yes**	**No**	**N/A**
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits	**Yes**	**No**	**N/A**
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?			X
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?			X
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?			X

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?			X
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?			X
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		X	
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?			X

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Douglas Frasier
Title	Environmental Specialist II
Signature	
Date	9 November 2007